

CALIFORNIA STATE DEPARTMENT OF PUBLIC HEALTH

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Weekly Bulletin

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Entered as second-class matter February 21, 1922, at the post office at Sacramento, California, under the Act of August 24, 1912. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917.

Vol. X, No. 30

August 29, 1931

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EDITOR

Relapsing or Spirillum Fever

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Since 1921 it was known that sporadic relapsing fever is indigenous along the eastern border of California and in Nevada. Previously Meader (1915) saw cases which originated in the Bear Creek Canyon of Colorado, and more recently Weller and Graham (1930 and 1931) reported the endemic occurrence of the disease in central Texas, near Austin. The microscopic demonstration of the spirochaete in California was first accomplished by Briggs in 1921 on the blood smears of two cases who contracted the infection in the vicinity of Polaris, Nevada. Two cases were reported in 1930 from the same region and one from a place eighty miles south of Reno, Nevada. Other cases observed during the same year originated in the mountain regions of southern California. During the months of June and July of this year spiral bodies were again seen in four blood preparations made from patients who had camped in widely separated areas of the eastern California mountain ranges at an altitude above 5000 feet. Data concerning the distribution and frequency of this particular malady would be of greatest value in order to institute preventive measures if practical. The physicians and health officers must assist in the collection of this information. The State Department of Public Health has therefore made relapsing fever a reportable disease. It is the purpose of this brief statement to present a description of this very interesting infection.

Clinical Symptoms: The incubation time is not defi-

nitely known. In the cases observed by Briggs the symptoms developed eight days after an insect bite had been noticed. By analogy with other spirochaetal infections it may be assumed that the incubation period is probably under twelve days. Prodromal symptoms are usually absent. The patient is suddenly seized by severe frontal headache and chilliness lasting from fifteen minutes to several hours. The mounting fever may be accompanied by anorexia, nausea, vomiting and giddiness, which force the patient to take to bed. An examination elicits a temperature of 104° F. or higher, increased pulse rate, flushed face, hot skin, coated tongue, a slightly icterus tinge of the conjunctiva, and tender liver margins. In the cases thus far seen the spleen was not definitely palpable. Muscular and joint pains, particularly the thighs and wrists, may be very pronounced. This attack may last two to several days, the symptoms increasing in severity to a crisis which manifests itself in a rapid falling of the temperature to normal, profuse sweating, and an apparent restoration to health. As a rule this is not the end of the disease but merely one paroxysm which is followed by an afebrile interval. A relapse may occur in from five to seven days after the crisis of the first attack. The symptoms may be the same as those noted during the first attack, but it is usual for them to be less severe and of shorter duration. In some cases observed in Nevada and California a second, third, and fourth relapse of the same intensity as the

first attack have been recorded. However, complete recovery after the first relapse may take place.

During the initial attack a macular rash and herpes labialis may be present. Constipation is usual, although diarrhoea may follow the crisis. The urinary findings may be entirely negative and the blood examination reveals during the paroxysms a slight mono or polynuclear leucocytosis. If the patient is permitted to have repeated paroxysms he loses weight and may exhibit a yellowish icteric discoloration of the skin.

Diagnosis: The definite diagnosis is easily established by the *finding of the spironema, or spirochaeta recurrentis*, the causative organism, *in the blood during one of the paroxysms*. A drop of fresh blood is either examined by direct light or by dark field illumination. The motile, wave-like or corkscrew shaped spirals moving back and forth or in circles between the red corpuscles are readily recognized. The india ink method and its modification may take the place of the dark field illumination. A direct *thick* or *thin* smear of the blood and stained by any one of the polychrome stains, such as Wright's or Giemsh's, is equally satisfactory. In case the parasites are few it is advisable to examine thick blood drops which have been laked with distilled water before they are fixed with alcohol or acetone. They are then stained for at least one hour with the polychrome stain diluted in slightly alkaline distilled water (pH 7.8 to 8.0). Excellent preparations are also obtained with dilute Carbofuchsin or gentian violet, provided the smears are fixed (1 minute) in formalin (20 parts)-acetic acid (1.0 part) solution (dist. water 100.0), covered with 10 per cent tannic acid solution and steamed for a minute, thoroughly rinsed in tap water and then stained with Carbofuchsin. In such preparations all parasites are deep red. It is important to emphasize that in mild attacks the spirochaetes may be scanty and a prolonged search will be required for their detection.

Differential Diagnosis: Sporadic cases are readily confused with malaria and influenza. For differentiation, the finding of the parasites is essential. Relapsing fever should not be mistaken for undulant fever.

Prognosis: The disease tends to be self-limiting. Since the arsenicals have been found to be specific the duration of the disease can be shortened and the mortality reduced to exceedingly low figures. The California and Nevada cases have promptly responded to therapeutic intravenous injections of 0.3 to 0.6 gm. neoarsphenamine. However, it is advisable to keep the patient under observation for at least three weeks following apparent recovery.

Etiology and Mode of Transmission: A cursory examination of the blood smears prepared from the

few recent cases reveals a spirochaete with an average length varying between 15 to 26 micro. No morphological differences between other blood spirochaetes have been observed. Detailed comparative studies will be required to prove the identity of the parasite with *Spirochaeta Novyi*, the spironema observed by Weller and Graham in Texas or the parasite described by St. Jones and Bates from Central America. Preliminary tests have proven the transmissibility of the parasite to macacus monkeys, rats and mice. The infection in the monkeys tends to relapses, in the rodents it is mild and of very short duration.

Nothing definite is known regarding the mode of transmission. By analogy with other relapsing fever spirochaetes insect vectors are suspected. It is well known that lice and ticks transmit the parasites not by their bite but indirectly by the contamination method. The accidental crushing of an infected louse liberates the spirochaetes which find readily entrance to the human host through the abrasions caused by scratching. Likewise the transmission by tick is indirect. The feces and the excretions of the coxal glands contain the spirochaetes and thus convey the infective agent to the bite wound. The early histories of the Nevada and California relapsing fever cases invariably note the occurrence of a bite due to an insect. Some patients saw a small brown bedbug-like arthropod while others describe ticks. In the regions in which the cases have occurred ticks of the species *Ornithodoros* are known to occur. The recent observations in Texas have proven that *Ornithodoros turicata* is the transmitting host of the relapsing fever spirochaete in that region. This insect lives in an arid, hot climate, and has been found in the burrows of ground rodents on which it feeds. The larval, nymphal and adult stages of the tick are infectious, since the parasite is hereditarily transmitted through the egg. It is known that this species of tick bites man and animals, particularly during the night. Peculiar feeding habits prevent it from remaining on the host for more than thirty minutes. As a rule the tick drops off immediately after the bite.

Thus far the existence of this tick in California and its rôle as a vector for relapsing fever in the State is a matter of conjecture. The peculiar occurrence of these infections during the summer months when ticks are particularly active, rather forcibly suggests that this or a closely related species of *Ornithodoros* must bear the stigma of being the transmitting hosts until investigations now in progress have been completed. The brilliant studies of Nicolle and Anderson on relapsing fever in Tunis indicate that the blood spirochaetes commenced as parasites of small mammals and that burrowing rodents serve as reservoirs of the

disease. Similar conclusions have recently been drawn by Mathis with respect to the Senegal fever and by Clark, Dunn and Benavides with regard to relapsing fever observed in Panama. The spirochaetes found in the rats and mice in Senegal, or squirrel-monkeys of the Isthmus are apparently identical with the human spirochaetes observed in these regions. It is therefore not unlikely that relapsing fever is primarily a disease of mammals and that the vector merely transmits the virus to man accidentally. Furthermore the relation between any particular spirochaete and the tick by which it is transmitted in nature is only a geographical one. From the standpoint of prevention it is evident that the habits of the invertebrate carrier is the only check on the spread of the spirochaetal infection they transmit. Until they are known the early recognition and prompt treatment with arsenicals is obviously important.

NOTICE OF EXAMINATION

The next examination for certificate as Public Health Nurse will be held simultaneously in San Francisco and Los Angeles on Saturday, December 19, 1931.

Requests for blanks for this examination must be made before November 15, 1931.

Completed applications must be on file in the office of the State Department of Public Health, Room 337, State Building, San Francisco, not later than December 8, 1931.

Applicant for this examination must specify the city in which she desires to take the examination in a letter accompanying the completed application to the department; otherwise, she will be assigned to the city nearest the address of her application. After the admission cards are sent out the place of examination *can not* be changed except for a very urgent reason.

GILES S. PORTER, M.D.,
Director of Public Health.

MALARIA SURVEY

Only thirteen positive examinations for malaria were found out of 1109 blood smears taken in a malaria survey of Shasta and Tehama Counties. Most of these positive smears were obtained in the southern part of Shasta County. Among the localities surveyed were Anderson, Cottonwood, Los Molinos, Vina, Latona and Deer Creek School District. As a matter of fact, the prevalence of malaria in the northern section of the State has been reduced greatly, and the favorable results of this survey indicate that malaria has almost disappeared from California.

RELAPSING FEVER IN CALIFORNIA

The following cases of relapsing fever have been reported to the State Department of Public Health:

1921	-----	2 cases
1930	-----	5 cases
1931 (to date)	-----	5 cases

On July 11, 1931, the State Board of Public Health passed a resolution declaring relapsing fever a reportable disease.

Health officers and physicians are urged to immediately notify the State Department of Public Health at San Francisco regarding any suspected or proven cases brought to their attention. An investigation of the possible sources of infection is being conducted and the immediate notification of cases and suspects is essential for the success of this study.

DR. A. HIERONYMUS, HEALTH OFFICER OF OAKLAND

Dr. A. Hieronymus, who for twenty years served as City Health Officer of Alameda, has been appointed Health Officer of Oakland. The health department is placed on a full-time basis with the health officer devoting all of his time to the duties of the office. His appointment was made by City Manager O. E. Carr, who is reorganizing the city government under the new charter.

Dr. Hieronymus succeeds Dr. Mark Emerson, who served as a part-time official and did not wish to be considered an applicant for the position on a full-time basis.

RECENT APPOINTMENTS TO THE STATE BOARD OF PUBLIC HEALTH

Governor James Rolph, Jr., has appointed Dr. William R. P. Clark and Dr. John H. Graves as members of the State Board of Public Health to succeed Dr. Adelaide Brown and Dr. Edward F. Glaser, resigned.

Dr. Clark has served as a member of the faculty of Stanford University, School of Medicine, and for over twenty years has served as a member of the Board of Directors of the San Francisco Tuberculosis Society. For many years he has been director of the Bureau of Tuberculosis, San Francisco Department of Health, and in that position has been in charge of the Tuberculosis Division of the San Francisco Hospital and of the San Francisco Health Farm.

Dr. Graves has been engaged in the practice of medicine in San Francisco since 1896. During 1918, he served as president of the San Francisco County Medical Society, and during 1921-1922 as president of the California Medical Association.

MORBIDITY ***Diphtheria.**

49 cases of diphtheria have been reported, as follows: Alameda 1, Pleasanton 1, Fresno County 1, Imperial County 2, Kern County 1, Lake County 1, Los Angeles County 6, Compton 1, Los Angeles 12, South Gate 1, Bell 1, Sausalito 1, Monterey County 1, San Bernardino County 1, San Diego 5, San Francisco 5, Manteca 1, Paso Robles 1, Santa Cruz 1, Modesto 1, Tehama County 1, Fillmore 2, Yuba County 1.

Scarlet Fever.

36 cases of scarlet fever have been reported, as follows: Alameda 1, Oakland 3, Fresno County 6, Los Angeles County 4, Long Beach 2, Los Angeles 5, Pasadena 1, Fullerton 1, Santa Ana 1, Upland 3, San Francisco 3, San Luis Obispo County 2, Santa Barbara 1, Santa Clara County 1, Tulare County 1, Woodland 1.

Measles.

29 cases of measles have been reported, as follows: Berkeley 1, Hayward 1, Oakland 1, Humboldt County 1, Bakersfield 1, Los Angeles 8, Madera County 1, Pacific Grove 1, Fullerton 1, San Diego 2, San Francisco 2, Stockton 5, Palo Alto 1, Stanislaus County 3.

Smallpox.

8 cases of smallpox have been reported, as follows: Fresno 1, South Gate 3, Monterey County 3, Tulare County 1.

Typhoid Fever.

18 cases of typhoid fever have been reported, as follows: Alameda County 1, Oakland 1, Fresno County 2, Imperial County 2, Holtville 2, Compton 2, Pasadena 2, Sausalito 1,

Riverside County 1, Sacramento County 2, San Diego 1, San Francisco 1.

Whooping Cough.

177 cases of whooping cough have been reported, as follows: Alameda County 1, Alameda 2, Berkeley 15, Oakland 8, Colusa 7, Contra Costa County 1, Richmond 2, Fresno 1, Humboldt County 1, Lake County 9, Los Angeles County 23, Avalon 3, Claremont 1, Glendale 1, Huntington Park 1, Los Angeles 9, Pasadena 9, San Fernando 1, Santa Monica 3, Marin County 3, Sausalito 1, Modoc County 2, Huntington Beach 1, Santa Ana 3, La Habra 2, Sacramento 1, La Mesa 1, San Diego 8, San Francisco 22, Stockton 9, Paso Robles 2, San Luis Obispo 1, Daly City 3, Santa Barbara County 1, Santa Barbara 10, Santa Maria 2, Santa Clara County 1, Palo Alto 2, Trinity County 4.

Meningitis (Epidemic).

6 cases of epidemic meningitis have been reported, as follows: Fresno County 2, Imperial 1, Alhambra 1, Long Beach 1, Roseville 1.

Poliomyelitis.

3 cases of poliomyelitis have been reported, as follows: Taft 1, Tulare County 2.

Food Poisoning.

Los Angeles County reported 5 cases of food poisoning.

Relapsing Fever.

Placer County reported one case of relapsing fever.

* From reports received on August 24th and 25th for week ending August 22d.

COMMUNICABLE DISEASE REPORTS

Disease	1931				1930			
	Week ending			Reports for week ending Aug. 22 received by Aug. 25	Week ending			Reports for week ending Aug. 23 received by Aug. 26
	Aug. 1	Aug. 8	Aug. 15		Aug. 2	Aug. 9	Aug. 16	
Actinomycosis	1	0	0	0	0	0	0	0
Anthrax	0	1	0	0	0	4	1	2
Chickenpox	34	32	49	20	28	28	27	48
Coccidioides Granuloma	0	1	0	0	2	1	0	0
Diphtheria	45	31	37	49	39	40	43	36
Dysentery (Amoebic)	2	1	1	1	2	2	0	2
Dysentery (Bacillary)	5	4	1	3	5	7	1	2
Encephalitis (Epidemic)	2	2	0	0	5	1	2	0
Erysipelas	12	7	19	8	12	15	8	8
Food Poisoning	3	5	7	5	28	3	31	0
German Measles	2	5	6	9	5	7	2	4
Gonococcus Infection	159	187	180	203	97	187	148	169
Hookworm	0	1	0	1	0	0	0	0
Influenza	8	14	12	8	10	6	1	13
Jaundice (Epidemic)	0	0	0	0	0	1	0	0
Leprosy	0	0	0	0	1	0	0	1
Malaria	5	3	1	3	13	3	3	3
Measles	92	65	53	29	185	92	89	59
Meningitis (Epidemic)	1	8	3	6	6	2	3	5
Mumps	62	51	34	39	82	72	106	93
Ophthalmia Neonatorum	1	1	1	0	1	2	0	0
Paratyphoid Fever	1	1	2	3	1	4	1	1
Pellagra	4	3	0	3	5	2	2	0
Pneumonia (Lobar)	27	21	23	32	67	18	18	20
Poliomyelitis	4	8	2	3	76	60	51	62
Rabies (Animal)	11	7	8	8	9	12	5	17
Relapsing Fever	0	1	0	1	0	0	0	0
Scarlet Fever	43	28	21	36	30	37	29	34
Septic Sore Throat	3	2	1	0	0	0	0	0
Smallpox	7	15	1	8	22	19	12	9
Syphilis	184	172	194	190	159	188	147	194
Tetanus	0	0	0	0	3	2	0	3
Trachoma	2	1	3	2	4	1	1	3
Trichinosis	0	0	0	0	0	2	0	0
Tuberculosis	186	207	262	174	191	204	176	171
Tularemia	1	0	1	0	1	2	0	0
Typhoid Fever	16	25	14	18	33	20	24	19
Undulant Fever	4	1	0	0	2	3	1	2
Whooping Cough	146	179	172	177	122	116	78	100
Totals	1,073	1,090	1,108	1,039	1,246	1,163	1,010	1,080

Another case of relapsing fever of spirochetal origin reported.

Incidence of reportable diseases continue at low level.

Only a few cases of poliomyelitis reported: many eastern cities having epidemics of this disease.